Scattering problems involving electrons, photons, and Dirac fermions

Snyman, I.

List of publications

- *A non-unitary mapping from Cooper pairs to bosons*, I. Snyman and H. B. Geyer, Czech. J. Phys. **54**, 1133 (2004).
- *Quasi-hermiticity and the role of a metric in some boson Hamiltonians*, H. B. Geyer, F. G. Scholtz and I. Snyman, Czech. J. Phys. **54**, 1069 (2004).
- *The Richardson Hamiltonian in the strong coupling limit: new results from an application of the non-unitary Dyson mapping*, H. B. Geyer and I. Snyman, Czech. J. Phys. **55**, 1091 (2005).
- *Quantum tunneling detection of two-photon and two-electron processes*, J. Tobiska, J. Danon, I. Snyman and Yu. V. Nazarov, Phys. Rev. Lett. **96**, 096801 (2006) [Chapter 3].
- *Strong-coupling limit of the Richardson Hamiltonian analyzed using the Dyson mapping*, I. Snyman and H. B. Geyer, Phys. Rev. B **73**, 144516 (2006).
- *Ballistic transmission through a graphene bilayer*, I. Snyman and C. W. J. Beenakker, Phys. Rev. B **75**, 045322 (2007) [Chapter 5].
- *Valley-isospin dependence of the quantum Hall effect in a graphene p-n junction*, J. Tworzydło, I. Snyman, A. R. Akhmerov and C. W. J. Beenakker, Phys. Rev. B **76**, 035411 (2007) [Chapter 6].
- *Polarization of a charge qubit strongly coupled to a voltage-driven quantum point contact*, I. Snyman and Yu. V. Nazarov, Phys. Rev. Lett. **99**, 096802 (2007) [Chapter 4].
- *Advancing science in Africa*, J. van den Brink and I. Snyman. Nature Materials **6**, 792 (2007).

- *The Keldysh action of a general time-dependent scatterer*, I. Snyman and Yu. V. Nazarov, Phys. Rev. B **77**, 165118 (2008) [Chapter 2].
- *Calculation of the conductance of a graphene sheet using the Chalker-Coddington network model*, I. Snyman, J. Tworzydło and C. W. J. Beenakker, Phys. Rev. B **78**, (2008) [Chapter 7].

Curriculum vitæ

I was born on the 23rd of July 1980 in Johannesburg, South Africa. I received my primary and secondary school education in the city of my birth. In 1998 I graduated from Hoërskool Florida. In 1999 I enrolled at the Rand Afrikaans University in Johannesburg, for a Bachelors degree in Physics. With a view to becoming a theoretical physicist I moved to the Western Cape after a year, and continued my Bachelor studies from the second year onward at the University of Stellenbosch. After obtaining my Bachelors degree at the end of 2002, I started working under Prof. H. B. Geyer on my Masters thesis at the Institute of Theoretical Physics at the University of Stellenbosch. This work is entitled *Analysis and applications of the generalised Dyson mapping*. I obtained my Masters degree at the end of 2004. At the start of the next year I joined the group of Prof. C. W. J. Beenakker at the Institute Lorentz for Theoretical Physics in Leiden. I was jointly supervised by Prof. Beenakker and by Prof. Yu. V. Nazarov from Delft University of Technology. The main results of the work I did under their guidance are contained in this thesis.

During my Masters studies I was a teaching assistant for a course in quantum mechanics and one in thermodynamics. In Leiden I supervised students during exercise classes for the course Electromagnetism II from 2005 until 2007. In the course of my studies I attended several summer schools and conferences in the Czech Republic, England, Italy, the Netherlands and South Africa. I have given talks about my work at meetings in Prague, Delft and Catania.

As of the southern spring (fall in the northen hemisphere) of 2008, I will be employed as a researcher at the newly formed National Institute for Theoretical Physics in Stellenbosch, South Africa.